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Low Frequency of Healthcare Worker (HCW) Infections Following Occupational Exposures to COVID-19

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Abstract

Background: Data on occupational acquisition of COVID-19 in healthcare settings are limited. Contact tracing efforts are high resource investments.

Methods: Duke Employee Health and Infection Prevention developed robust COVID-19 contact tracing methods as part of a comprehensive prevention program. We prospectively collected data on HCW exposures and monitored for development of symptomatic (SYX) and asymptomatic (ASYX) COVID-19 infection after documented high-, medium, and low-risk exposures. HCWs were identified through contact tracing as potentially exposed to COVID-19 positive HCWs, patients or visitors. Contact tracers interviewed exposed HCWs and assessed the risk of exposure as high-, medium-, or low-risk based on CDC guidance (Table 1). Testing was recommended at 6 days after high- or medium-risk exposures and was provided upon HCW request following low-risk exposures. Our vaccination campaign began in 12/2020.

Results: 37,620 employees are listed in the contact tracing database. From March 2020-May 2021, we identified 6,606 occupational exposures (0.18 exposures/HCW). The highest incidence of workplace exposures per number of HCWs in each job category was among respiratory therapists (RT) (0.49 exposures/RT), medical assistants (NA) (0.46 exposures/MA), and advanced practice providers (APPs) (0.64 exposures/APP). The most common exposure risk level was medium (51.4%), followed by low (35.5%), and then high (13.1%). A total of 260 (2%) HCW had positive tests/conversions; 28 (10.8%) were ASYX at the time of testing. High-risk exposures had a significantly greater number of post-exposure infections compared to medium- and low-risk exposures (12.5% vs. 4.2%, vs. 0.4%; p < 0.001). The rate of SYX infection following exposure to a fellow HCW (179/3,198; 5.6%) was higher than that following exposure to a patient (81/3,408; 2.4%; p<0.001).

Conclusions: Conversion following exposure to COVID-19 in the healthcare setting with appropriate protective equipment was low. Incomplete testing of all exposed individuals was a limitation and our data may under-estimate the true conversion rate. Our findings support our local practice of not quarantining HCWs following non-household exposures. Limiting contact tracing to only high or medium risk exposures may best utilize limited personnel resources.

Background

- Since the start of the COVID-19 pandemic healthcare workers (HCWs) have been exposed to COVID-19
- The data on occupational acquisition of COVID-19 in the healthcare setting in the United States is limited
- Understanding the transmission risk is particularly important for guiding evidence-based protective measures

Methods

- Duke Employee Health and Infection Prevention developed a robust COVID-19 contact tracing program
- We prospectively collected data on HCW exposures and monitored for COVID-19 infection after high-, medium- and low-risk exposures from 3/2020 to 3/2021 (Table 1)
- Asymptomatic testing was only performed after high-risk exposures, during cluster investigations, or upon HCW request

Table 1: Exposure risk classifications (adapted from CDC Interim U.S. Guidance for Risk Assessment and Work Restrictions for Healthcare Personnel with Potential Exposure to SARS-CoV-2).

Type of Exposure	High Risk	Medium Risk	Low Risk
Household Exposure	Always high risk	--	--
Contact with unmasked COVID-19 positive patient, HCW, or visitor for > 15 min and < 6 ft while at work	Exposed healthcare worker NOT wearing a surgical facemask or respirator	Exposed healthcare worker wearing surgical facemask or respirator but no eye protection	Exposed healthcare worker wearing a surgical facemask and eye protection but no gown or gloves Healthcare worker wearing all recommended PPE
Contact with masked COVID-19 patient or HCW for > 15 min and < 6 ft at work	--	Exposed healthcare worker NOT wearing a surgical facemask or respirator, or no PPE at all	Exposed healthcare worker wearing surgical facemask or respirator but no eye protection Exposed healthcare worker wearing a surgical facemask and eye protection but no gown or gloves Exposed healthcare worker wearing all recommended PPE
Performed a high-risk aerosol-generating procedure on COVID-19 patient	Healthcare worker wearing gown, gloves, and surgical facemask but no eye protection	Healthcare worker wearing a gown, gloves, eye protection, surgical facemask	Healthcare worker wearing a gown, gloves, eye protection, N95 or PAPR

Results

- We identified 6,606 occupational exposures among 37,620 HCWs (0.18 exposures/HCW)
- The highest incidence of workplace exposures was among respiratory therapists (RT) (0.49 exposures/RT), medical assistants (MA) (0.46 exposures/MA), and advanced practice providers (APPs) (0.39 exposures/APP) (figure 1).
- 260 (2%) HCW had positive tests/conversions
- High-risk exposures had a significantly greater number of post-exposure infections compared to medium- and low-risk exposures (12.5% vs. 4.2%, vs. 0.4%; p < 0.001).
- The rate of infection following exposure to a co-worker (179/3,198; 5.6%) was significantly higher than that following exposure to a patient (81/3,408; 2.4%; p<0.001).

Figure 1. Number of reported exposures per number of healthcare workers in each job category, stratified by adjudicated exposure risk.

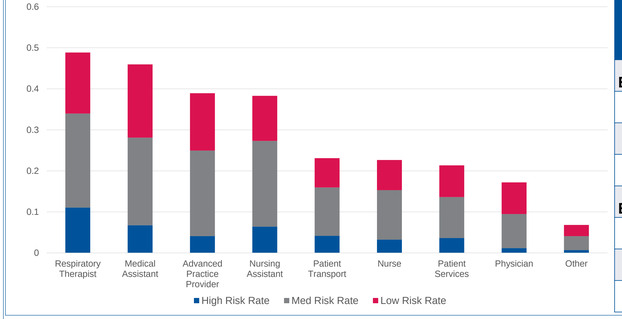

Table 2: Rate of HCW COVID-19 infections following different types of occupational exposures.

Exposure Risk Category	Exposures	Conversions	Asymptomatic Conversions	Conversion Rate
Exposure to HCW	3198	179	20	5.6%
High	548	97	9	17.7%
Medium	1383	76	10	5.5%
Low	1267	6	1	0.5%
Exposure to patient	3408	81	8	2.4%
High	315	11	1	3.5%
Medium	2014	67	7	3.3%
Low	1079	3	0	0.3%

Conclusions

- Conversion following exposure to COVID-19 was very low in the healthcare setting with appropriate protective equipment.
- Exposure to other infected HCWs may create a higher risk of transmission compared to exposure to infected patients
- Limiting contact tracing to only high or medium risk exposures may best utilize limited personnel resources.

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